Long-Lasting Pavement Solution for an Interstate

Guide Helps Washington State Meet Project Goals

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On Interstate 5 (I-5) northbound between Burlington and Bellingham, Washington, old concrete panels beneath the asphalt were causing severe transverse cracking along a stretch of 11.6 miles, or 23.08 lane miles. The Washington State Department of Transportation (DOT) placed hot-mix asphalt (HMA) over the faulted pavement in the early 1990s, and maintenance crews sealed large cracks as a temporary solution in 2009 and 2010.

Looking for a long-lived, cost-effective solution, Washington State DOT agreed to pilot the procedures in the guide produced by the second Strategic Highway Research Program (SHRP 2), *Using the Existing Pavement In-Place and Achieving Long Life*,[1] during the I-5 Joe Leary Slough to Nulle Road Vicinity project. A web-based decision support tool, the guide contains procedures for identifying when pavements can be used in place, as well as approaches to incorporate the original pavement material into the new structure.

Project Goals and Options

Washington State DOT's goals were to provide a long-lasting pavement solution for the I-5 rehabilitation, advertise the project within four months, and hold expenditures within a budget of $25 million. The SHRP 2 guide provided a valuable reference in speeding up the pavement selection and scoping process and in identifying the best strategies for rehabilitation with in-place pavements, leading to three viable options:

- CSOL—crack and seat the concrete with an 8.4-inch asphalt concrete overlay;
- Asphalt rebuild—pulverize the pavement in place for an 8.4-inch crushed surfacing base course (CSBC) with a 13-inch hot-mix asphalt (HMA) overlay; or
- Concrete rebuild—place a 4.2-inch CSBC, overlay with 4.2 inches of HMA, then overlay 13 inches of portland cement concrete pavement.

Photos: Jeffrey Uhlmeyer

Old concrete panels beneath I-5 in Washington State caused severe cracking in the roadway (*top*). Washington State DOT piloted a web-based decision support tool for in-place pavement recycling and seated the concrete with an asphalt concrete overlay (*bottom*).

Applying the Tool

To meet the project schedule, Washington State DOT immediately started the pavement design and the preparation of technical documents for the contract. The decision support tool provided the technical information for implementing the CSOL method, an alternative that the agency had not used previously; this increased management's comfort level.

The project team relied on the tool's resource documents, especially the best practices and specifications. The guide quickly and concisely educated practitioners at a detailed level on national and international practices; although correspondence with other agencies was not eliminated, the decision support tool focused the project team's efforts.

By the time the I-5 project went to Washington State DOT engineers, the team was confident in its success. The agency was able to develop the CSOL technical documentation and contract specifications within the time frame and advertised the project in the required four months.

Cost Savings

Washington State DOT awarded the project in February 2011 with design–build procurement. The 4.2-inch HMA overlay was removed, the pavement was cracked and seated, and an 8.4-inch overlay of HMA applied. On 5 lane miles, after the 4.2-inch HMA overlay was removed, the pavement received a dowel bar retrofit and 4.2 inches of HMA overlay. Miscellaneous repairs also were made to northbound and southbound ramps. The total initial cost of the project to the agency was $14.553 million, with an average cost of $582,000 per lane mile.

By identifying additional pavement rehabilitation alternatives, the SHRP 2 decision support tool assisted Washington State DOT in achieving significant savings initially and over the pavement's life cycle. The CSOL method saved Washington State DOT 19 percent in initial agency costs, 16 percent in agency costs for the roadway life cycle, and 28 percent in user costs over the life cycle. In addition, the method reduced construction-required lane closures by 43 percent.

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[1] www.trb.org/Main/Blurbs/168146.aspx.